SEMI-LUNAR

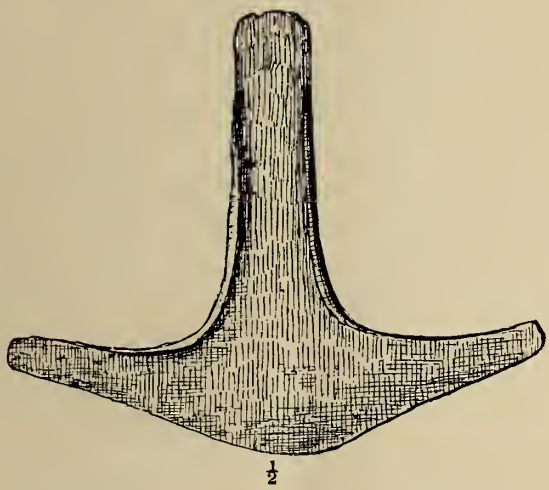
AND

CRESCENT-SHAPED TOOLS,

WITH SPECIAL REFERENCE TO THOSE OF MEXICO.

BY PH. J. J. VALENTINI,

NEW YORK.



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SEMI-LUNAR AND CRESCENT-SHAPED TOOLS.

By Ph. J. J. Valentini.

About six years ago two different works came to my hands, almost simultaneously, in which the authors advanced certain theories about the social condition and the industries of prehistoric Mexico.

The author of one of the works asserted that the natives, before the Spanish Conquest, were entirely unacquainted with metal and the uses it could be put to; they were still lingering in the helplessness of the Stone Age.

The author of the other work, though he stood face to face with one of the finest Palenque sculptures, could not satisfy himself that they were worked by means of metal chisels. He favored the theory that stone chisels or like tools had been employed, the reasons he alleged being that no mention of metal tools had been made by the Spanish writers and that no such kind of tool was ever discovered. In an elaborate note and with great earnestness he explains the ways and means by which stone can effectively be made to work on stone, success of course being only a question of patience and time.

The first of these theories was easy to explode. In a paper, published by this Society,[1] I showed that the early Mexicans were indeed acquainted with different sorts of metal, and that they knew how to extract, to smelt and to

[1] *Mexican Copper Tools*, by Ph. J. J. Valentini. Proceedings American Antiquarian Society, April 30, 1879.

P 44 885

cast it into moulds. This fact stands both on written and on painted record. The pictures exhibit coats of arms of certain cities which derived their names from the manufacture of copper axes; moreover, such axes appear drawn upon the roll of tribute, and men are represented in the attitude of working timber with copper blades fastened to curved handles.

As regards the other theory, it is not so easy to dispose of as I, in the beginning, thought it would be. The author stood on firm ground, when asserting that written tradition does not mention the fact that metal chisels were employed in stone sculpture. I took special pains to detect some passage that would disprove this theory of the stone chisels, but found the testimony in favor of them to be unanimous as well as plain. Nor do the paintings show the figure of any man doing the work of a stone-cutter or stone-sculptor, nor of any holding in his hands a tool recognized as a sculptor's metal tool. I know only of one single painting that could claim our attention in this direction. You will find it in the Codex Tro, where a man is represented carving an image.[1] But it is impossible to discriminate whether the tool in the hand of the man is meant to be of stone or metal, or whether the material of the image itself is meant to be of wood or stone. If looking for further evidence, I may indeed point to the picture of the bronze chisel, found by Dupaix in Oaxaca and represented in Vol. IV., pl. 1, p. 25, fig. 77, of Kingsborough's Collection. But then, whoever has made up his mind that sculpturing was performed by stone chisels, will perplex you by the question where the original of this Dupaix metal chisel is preserved. It seems to be lost. Our faith in the honesty of so conscientious an explorer as Dupaix was, will readily dispose of the slightest suspicion against this picture being a fraud—furthermore,

[1] Manuscrit Troano. Etudes sur le système etc., des Mayas, par Br. de Bourbourg, Paris, 1859, Vol. 1st, Planches XVIII., XVII., XVI., XV., XIV. and XII.

common sense will tell us that the Dupaix chisel can not possibly have been a unicum, and thus we must arrive at the conclusion that if one of its kind existed, thousands of them must have been employed by the ancient stone-cutters. The only defect of this argument is that it will never be able to place a real metal chisel in our hands, which we can grasp and examine with our eyes, weigh on our scales and have it analyzed in the laboratory. Archæology of to-day has become tired of mere syllogism. It has taken the stand of brave old Thomas. He wanted the evidence of touch. Therefore, up to this day evidence has been against the theory of metal chisels. Nevertheless, as the attention paid to this special subject is only of recent date, we need not give up the hope that some day a well authenticated specimen of metal chisel will come to light and with it the stone chisel too! For, though this is claimed to have been the tool employed by the sculptors, who has, I would ask, given practical proof that any of the specimens preserved in the collections and labelled stone chisels, could have wrought out the little symbol for the seventeenth month, Ollin, as seen on the Mexican Calendar Stone? For the present let our watchword be: Searching and Finding!

We need not complain, however, that our efforts have been without success in these past six years. When I wrote the last page of my paper above mentioned, I had not had one single specimen of ancient Mexican copper tools in my hands, or known of its existence elsewhere. I worked it all out of the Spanish texts and the picture-codices. Meanwhile a considerable number of these tools have come to light, of different shapes and uses. They are presents made to us by the Messrs. S. Stevens, A. Agassiz, L. H. Aymé and F. A. Ober, who acquired them on their exploring-tours in Mexico. The person who took the most interest in this subject was Mr. F. W. Putnam, curator of the Peabody Museum. You remember the day on which

he exhibited the specimens thus obtained and also those interesting copper objects which, through his own industry, he had been able to gather from the Western mounds. The written reports, with illustrations, are in your hands. They form important "principia" in the building of a new province of archæological research on our continent.

Among the specimens of Mexican origin, there are certain copper tools which attract attention on account of their peculiar crescent-shaped blades, and which are known to us under the name of copper-taus. Opinions are divided as to the purposes which these instruments may have served. That they represent tools is the first impression we received from their inspection. Some interpret them to be hoes, others take them for scrapers, and the Spanish chroniclers aver they represented money among the Mexican natives. I will not deny that occasionally they may have done all these and many more good services, but I must object that these instruments were planned and manufactured for the above purposes, but for what else I shall endeavor to explain.

Rounded blades, of which we now possess so many specimens of every variety in shape and size, are found to have been employed by man all over the globe, and in immemorial times. The most primitive tool of man in the Stone Age presents a blade, not with a straight edge as might be expected, but with a rounded one. This seems to be the rule, and perhaps we are able to divine the way by which man very early learned that only the rounded edge would do the work intended and prevent his instrument from being spoiled. Admitted that the first tool used by man was the *wedge*, the second step to make the wedge more efficient, must have been to lengthen it by the addition of a handle or a pole. The most important step, however, which he made further, was this, to set the wedge crosswise on the top of the handle. Though still rudimentary, yet the future axe was born. The first experience of the

happy father must have been sad indeed. For by striking softly with the new-born axe against the trunk of a tree, such strokes would not have had the power to bring it to the ground, and again at any vigorous stroke he felt tempted to make, the wedge must have entered the wood so deeply as to remain sticking in it. He arrived at the melancholy knowledge that he had driven, what we would call to-day, a dead bolt into the tree. Trying to improve the useless tool, he might have found the remedy in a new wedge, which had to be chipped somewhat flatter and to be provided with an edge a good deal longer than that of the former one, so that at the mightiest stroke he had the power of dealing the whole length of the blade would not enter the trunk, but on account of its roundness leave free both corner edges of the blade. This would have worked well, as long as he attempted felling small trees only. Yet as soon as he attempted to fell the giants of the forest, he found they were the stronger party. Either the axe got stuck again, or still worse, the stroke which failed to be made with the necessary power would have caused the corner edges of the blade to break in his efforts to extract it from the tree. Perhaps it was when grinding off the broken corner, and for the sake of symmetry the other corner too, that the so mended instrument turned out to be the only perfect one. He was then able to wheel it out from the trunk, with the greatest ease, at every stroke he made. Directed by the lever of the handle, each corner turned undisturbed around a pivot.

Such, more or less, may be imagined as the genesis of the curved edge. On whatever part of the globe stone axes have been discovered or are still found to be in use, we shall observe that the sides of the blade never meet the edge at an acute, but always at a right angle. It is against the nature of stone itself, which forbids that any strong pressure should be exerted upon an angle less than ninety degrees without breaking. It was only after the invention

Fig. 1.

of metal working that man could allow himself to depart from the time-honored experience and give play to his innate impulse of evolving new forms. Consequently, if a stone implement comes to our hands, the blade of which shows a deviation from this rule and does extend its edge beyond the two sides and thus exhibit what may be called projecting wings, we may be certain that such an instrument was not manufactured for the purpose of doing any serious work, but was shaped so for other and probably for ceremonial purposes.

With the intention of ascertaining the fact as to what people, besides Mexicans, manufactured tau-formed or crescent-shaped blades, I had to examine a large number of archæological works. My harvest was but scanty, yet the very first illustration I met with, in John Evans's work,[1] offered a very encouraging sight. It was that of the so-called Montezuma axe, preserved in the Royal Imperial Ambras Collection, Vienna. Fig. 1. The blade, as you notice, is almost of the same shape as our Mexican copper crescents. The hafting, however, effected by a certain plait-work of strings, must arouse the suspicion of every one acquainted with Mexico's prehistory. In order to get at

[1] John Evans, Ancient Stone Implements, etc., of Britain. New York, Appleton, 1872. (Page 142, fig. 96).

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Fig. 2.

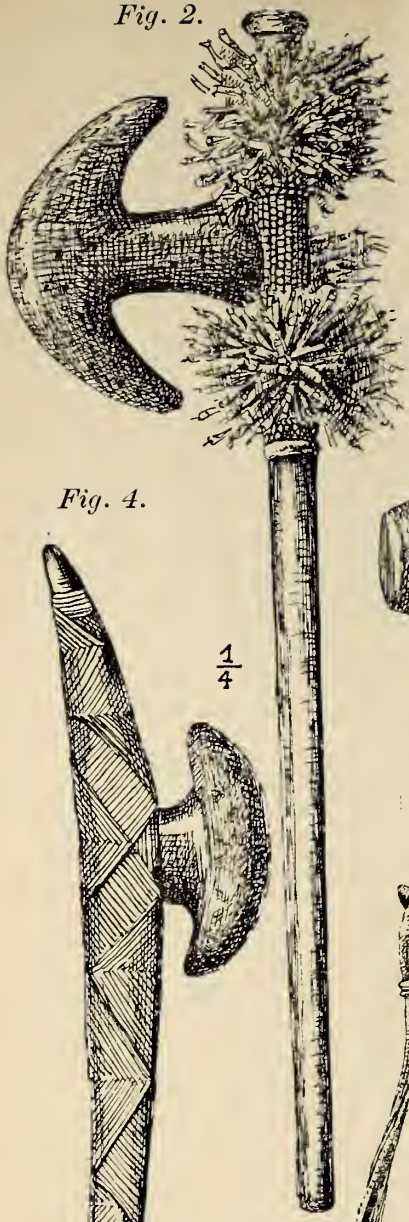

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Fig. 3.

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Fig. 6.

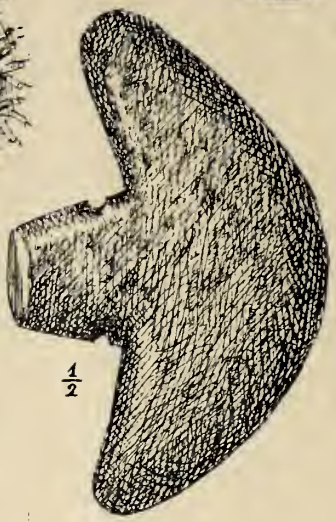

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Fig. 4.

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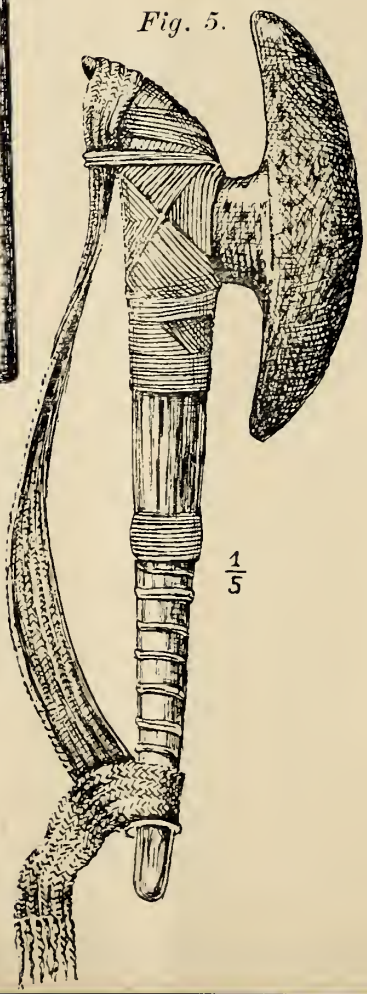
Fig. 5.



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particulars concerning this Montezuma axe, I opened a correspondence with my Vienna friend, Prof. Fred. Müller, who kindly sent me a memoir just published on the same subject and written by one of Europe's most illustrious explorers, Ferd. von Hochstetter, a few months before his death. In substance, he writes, as follows: "The axe is one of the many precious specimens, preserved in the Ambras Collection, which in 1596, after the death of its owner, the Archduke Ferdinand of Tirol, was incorporated into the Imperial Court Museum. It is mentioned and described in each of the inventories made of it in 1596, 1613, 1621, 1730, 1788 and 1821. The blade is of syenitic material interspersed with two kinds of feldspar. Plaiting very skilful, similar to that on the Mangaia-stone axes (South sea archipelago). Handle of yellowish-brown wood, painted over with a rosin-like mass of cement." As to its origin, Mr. von Hochstetter on closer comparison with axes gathered from Brazilian tribes rejects the idea that the axe was of Mexican manufacture, and closes the treatise in the following words: "From all the statements furnished and the comparisons made the conclusion must be reached that the Mexican origin of the famous battle-axe of Montezuma is to be considered as more than doubtful, and we may fairly assume that this axe, if really obtained in Mexico by Cortez, had come into the hands of the 'Mörishen Khünings Muteazumo' (as the labels of the Ambras Collection read), either as a present or as spoils of war from some Brazilian tribe."

In order to give you a full idea of the Brazilian crescent-shaped stone-axes, spoken of by v. Hochstetter, and preserved in various European museums, I give you a copy of the illustrations gathered and published by him at the end of his memoir.

Figure 2. A second specimen of a so-called Montezuma battle-axe. Also in the Ambras collection.

Figure 3. Stone blade, found by Dr. Pohl, 1817–1821,

with the Paragramacras Indians, river Tocantin, Province Goyaz, Brazil; very similar to the Montezuma axe; is of syenitic material.

Figures 4 and 5. Stone axes, conjectured to come from Brazil, river Tocantin. Preserved in Dresden for more than two hundred years, first in the Royal Historical Museum, afterwards in the Royal Ethnographical Collection.

Figure 6. Stone blade without handle, from river Machado, affluent of river Madeira, north-western Brazil. Ethnographical Collection of Vienna.

Fig. 7.

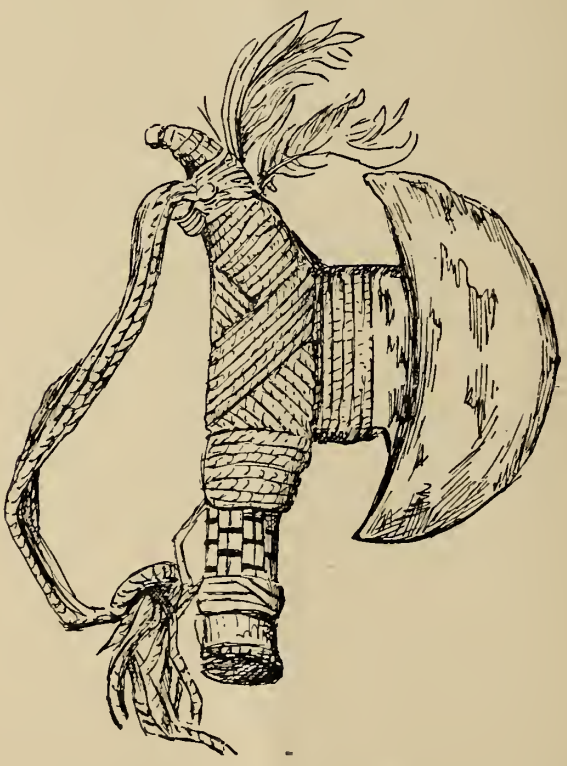


Figure 7 is taken from Evans, page 141. Original in the British Museum, London. Gathered from the Gavioñes Indians, Brazil.

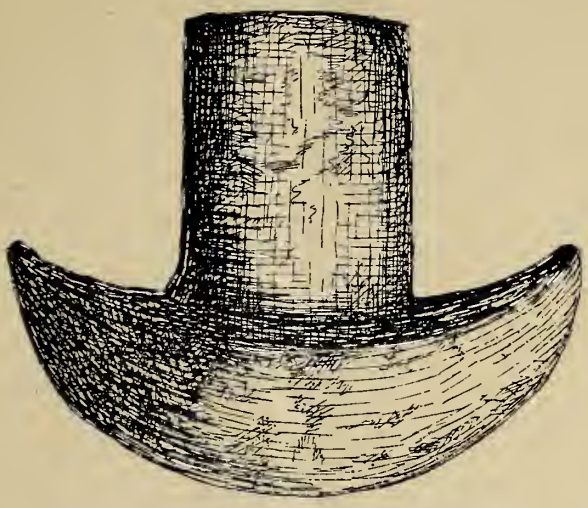
Inspection of these illustrations, and comparison made between them and the Montezuma axe, will suffice to make us respect the conclusion reached by Mr. von Hochstetter as to the origin of the latter specimen. Full evidence, in this regard, however, is not furnished unless proof is given that the wood of the handle, the fibre of the plait-work, and the stone of the blade are Brazilian products. That Montezuma obtained the axe as a present or as spoils of war from Brazil is a suggestion lacking probability. But if an explanation is asked for, how an axe of now recognized South American origin should have been sent from Mexico to Europe, it may be found in the light of the following considerations: Directly after the Conquest of Peru and Chili, an official traffic was established between the two dominions, and curiosities, therefore, though gathered in South America and shipped to Mexico, passing through various hands, may have been taken in Europe as having a direct Mexican origin. Should any of the Ambras specimens, upon closer examination later, turn out to be of Polynesian manufacture, it may in like manner have found its way to Europe through Mexico. Saavedra, sent out by Cortez into the Pacific to make discoveries, in 1527, stands on record to have reached the Molucca Archipelago, and to have bartered with Papuas as well as with Polynesians. In 1542 he was followed by Villalobos, who discovered the Caroline and the Marshall Archipelago. Legaspi and Urdaneta in 1565 transported the first colonists to the Philippines and founded Manila.[1] We also know these captains were especially directed to gather in those distant seas any product of nature, industry or art, tending to illustrate the quite unknown condition of the people and their country. In all these circumstances the clue may be discovered for the belief into which the European amateurs were led, intentionally or unintentionally, that the objects

[1] See on this subject Geschichte der Erdkunde von Oscar Peschel, Seite 322, 299. München, 1865.

presented to them came directly from the palaces of Montezuma. On the other hand, however, I cannot detect any clear evidence that this belief existed at the time when the Ambras Collection was transported to Vienna. Mr. von Hochstetter gives quite a full enumeration of these objects and of the wording of the labels appended to them. Upon reading the description of the objects, as given in the first inventory made of them in 1596, I cannot find that the objects mentioned were considered to have come from Mexico. Fans, feather-wreaths, robes, hairdresses were also in use with the chieftains of Peru or of Gilolo. Nor do the labels give the Mexican names, Temistitlan, Montezuma or Cortez. They simply speak of Moorish dresses, Indian fans and plumages and of Indian battle-axes. This same wording is also used in the inventory made in the year 1613. It is only in 1621 that the Indian battle-axe is described as having been in the possession of the "powerful Muteazumo, King of Mexico," which description, in the inventory of 1788, becomes: "Battle-axe of Montezuma II., King of Temistitlan at Mexico, which was sent by Hernan Cortez to the Pope, who made a present of it to the Archduke Ferdinand." Everybody knows what to think of such alterations and additions made to an original text. But my skepticism does not go so far as to pretend that there was not a single piece of true Mexican origin contained in the Ambras Collection. It was very probably composed of specimens gathered from beyond the Pacific coast and mixed up with others of Mexican origin. On account of this lack of authentic evidence, the true origin of each object will be best interpreted from the constituent parts of which each of these presents is composed. Thus much on the famous Montezuma axe.

Stone implements of crescent shape must be of very rare occurrence in the ancient world. At least, out of the one hundred and fourteen works on archæology, the illustrations of which I was able to consult, I only discovered this

Fig. 8.



specimen in Fig. 8. It is taken from F. Keller's work on the Lake Dwellings, Plate CXVII., Fig. 3. The original was dug out in Cumarola, near Modena, and is of dark green serpentine. The blade shows a strong resemblance to that of fig. 6 (see opposite page 10), in the Dresden Museum.

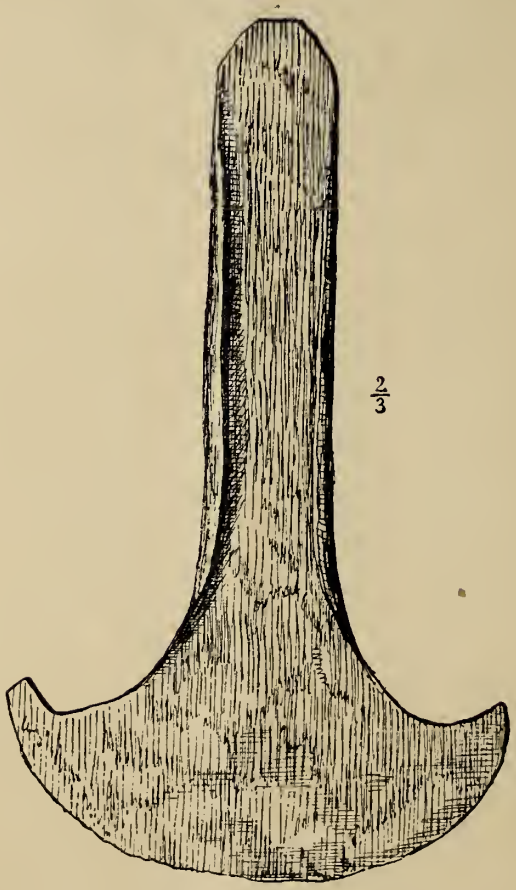
I now pass over to the discussion of the metal implements of semi-lunar and crescent shape.

Were the progress which men made in comfort and art, during the Bronze Age, to be judged by nothing else than by the implements left behind, they alone would suffice to give us an insight into the enormous revolution which the first striking of a copper vein caused in the history of evolution to civilization. One begins to realize what the ancient poets meant when singing of Prometheus's audacious deeds. He is the victorious rebel against thraldom and superstition. The dreaded elements of nature he now takes in his own hands and makes them his obedient slaves. He chains the fleet feet of the wind to the head of the blazing fire and sets both fiends allied against the strongholds of the ore to drive the precious contents out of their

useless seclusion. Young Prometheus becomes a smelter, a moulder, a caster, a smith, a sculptor. The old tyrant of stone was dispossessed of his prestige. By its hard, unwilling temper, it used to break off when man was most in need of its helpful hand. Metal became a more complacent companion. He could bend it for his uses, and hammer and twist, cast and recast it, to his heart's delight, into all imaginable forms.

A new kind of tool, indeed, was not invented in the

Fig. 9.



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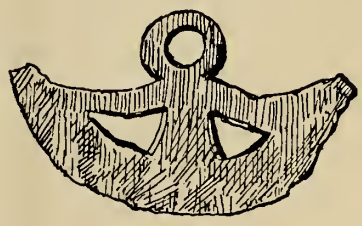
Bronze Age. The celt, the hammer, the axe, the adze, all his weapons, more or less, were modelled upon the accustomed ancestral stone pattern. But the pliant metal afforded the workman a freedom of treatment which stone had not allowed. The body of the blade is laterally bent in flanges to grasp a handle, and which later terminate in a cast socket. The edge, thereby, receives a semi-lunar shape, and the two horns projecting become capable of resisting the strain of any stroke, which, if the blade was of stone, would end in its destruction. Of such semi-lunar, flanged bronze implements, I will give you in fig. 9 the illustration of one specimen, which was disinterred in Plymstock, Ireland, and which I copied from J. Evans's Bronze Implements, page 50, fig. 7. It most approaches the shape of the Mexican copper-tau, the proportion between the width of the shank and the distance of the horns being that of one to four.

Fig. 10.



In fig. 10 you see a curious semi-lunar bronze object, now preserved in the Museum of St. Germain. It was found in a mound of Magry-Lambert, Côte d'Or, Burgundy. The copy is taken from Études Paléo-ethnologiques, Bassin du Rhône, E. Chantre, Album Age de Fer, planche XLV., fig. 2. The author says it represents a razor, the clapper-ring serving for suspension. (?) In fig. 11 we have another specimen of a Gallic razor (?) from a tumulus in Monceau Laurat, published by Alex. Bertrand, Archæologie Celtique et Gauloise, planche 76, page 298. The same author, on page 303, gives the cut of a razor of different shape, see

Fig. 11.

Fig. 12. *Fig. 13.*

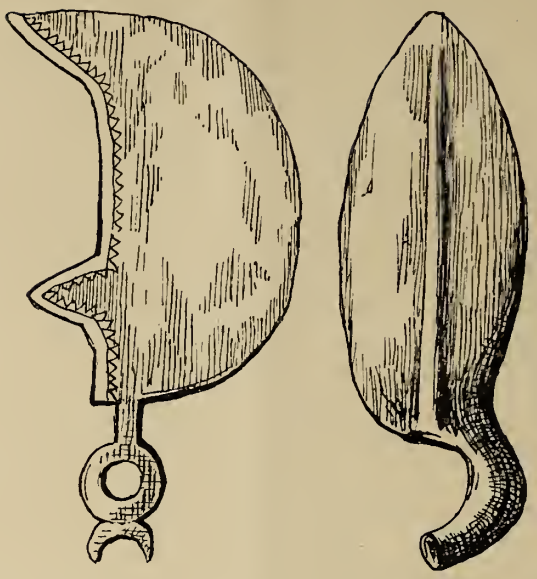


fig. 12, which comes from Chiusi (Italy), and that of fig. 13, from France, Station de Grésine; see Chantre Album, Age de Bronze, planche LVI., fig. 9.

Illustrations of axes with crescent-shaped blades engraved on huge granite boulders, were quite recently (1875) discovered in Simrislund, Schonen, South Sweden, by Mr. J. A. Nisbeth. They were published and described by Dr. J. Bruzelius, in Antiquarisk Tidskrift f. Sv., and again discussed by Dr. O. Montelius, in the publications of Congrès International d'Anthropologie et d'Archæologie, Stockholm, 1876, Session 7^{me}, page 475. In answer to my request for more special information regarding these rock-sculptures, Dr. Montelius was so kind as to furnish me with the following details: The male figure (see fig. 14) measures 47.5^{cm}, the blade 29.7^{cm}, the handle 59.4^{cm}. The carving is not deep enough to admit accurate measurement. On the same rock still another man is represented, quite similar to that of our diagram, and beside

him ten ships, thirty-four axes with handles, a horse, etc. These figures are set out in different groups. The rock is of quartzite sandstone and measures about 22 meters in

Fig. 14.

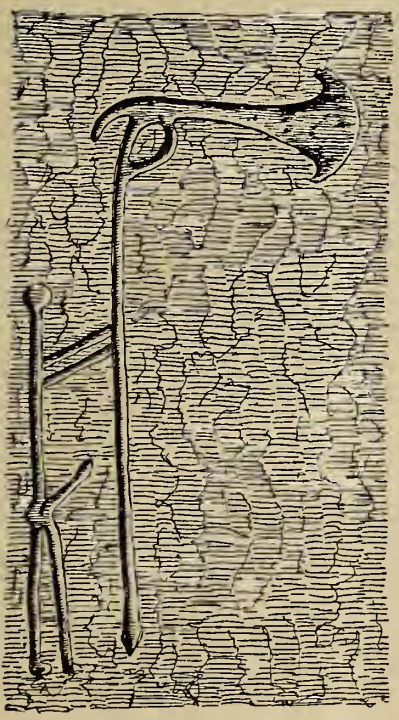


Fig. 15.

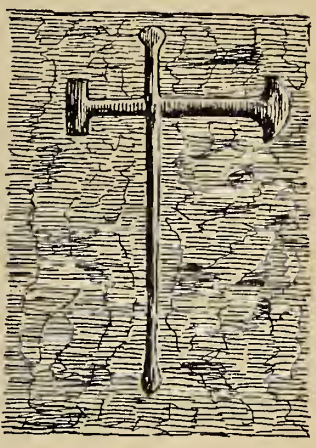
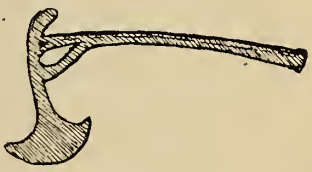


Fig. 16.

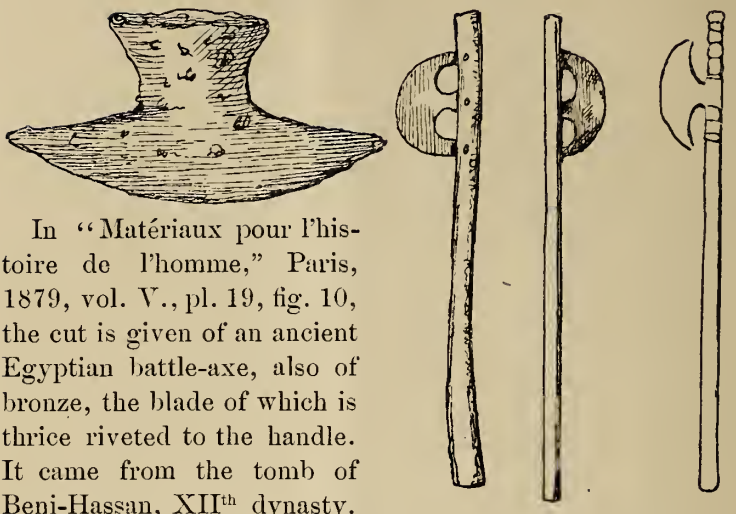


length and 15 meters in width. Figs. 15 and 16 are representations of axes as they appear in the other groups mentioned.

I am not aware that any discussion has been entered on with regard to the antiquity of these rock-sculptures, nor as to the nationality of the men figured thereon, nor regarding the carvers themselves.

In Beyrut, Asia Minor, a crescent-shaped axe blade of bronze was found and represented by Chantre, Age de Fer, plate VII., fig. 9. See fig. 17.

Fig. 17. *Fig. 18.* *Fig. 19.* *Fig. 20.*



In "Matériaux pour l'histoire de l'homme," Paris, 1879, vol. V., pl. 19, fig. 10, the cut is given of an ancient Egyptian battle-axe, also of bronze, the blade of which is thrice riveted to the handle. It came from the tomb of Beni-Hassan, XIIth dynasty. As this axe is about 4,260 years old, we may regard it to be the patriarch of semi-lunar shaped implements. See fig. 18.

Going as far as India we find Siva represented twice on the sculptured façades of the Brahmanical cave of Aihole. See Jas. Burgess, Arch. Survey, W. India, 1883, pl. XLIII., fig. 5. In one of these sculptures the god holds in his hand a battle-axe, the blade of which is almost identical with the Egyptian blade of Beni-Hassan (see fig. 19), except that the rivets do not appear. In the other, he holds a similar axe, but the blade is fastened with strings. (See fig. 20). The temple, indeed, does not belong to the prehistoric age, but the god does; and the question is whether such an axe is known to have been an attribute of his in the remotest epochs of Brahmanism.

I now turn to the blades of American workmanship. In the southern continent the ancient Peruvian was the copper-smith and bronze-caster *par excellence*. As will be seen in the adjoining cuts they knew how to manufacture

some very elegant specimens of semi-lunar blades. Fig. 21 is taken from Schoolcraft, Ethnological Researches, respecting the Red Men of America, vol. IV., page 438, pl. 39. Our esteemed associate, Mr. Henry W. Haynes, called your special attention to this specimen at the meeting of October, 1884. Mr. Thomas Ewbank, the writer of the article, describes the utensil in the following way:

Fig. 21.

"A Peruvian knife proper, with a circular blade, interesting from its resemblance to those used by the modern glovers and saddlers, and by Egyptian harness-makers under the Pharaos. They have been found variously modified. The blade is $4\frac{3}{4}$ inches long along the back. The widest part of the blade is $1\frac{1}{8}$ inches. The back is $\frac{1}{8}$ inch thick. The cylinder $\frac{3}{8}$ inch, and represents an inverted bird's leg and foot (?). When used, the right hand grasped the shank, while the ball of the thumb rested between the open claws. In this way a firm hold and

Fig. 22.

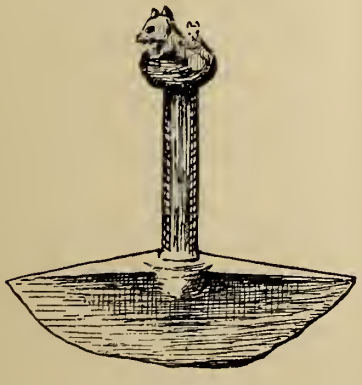
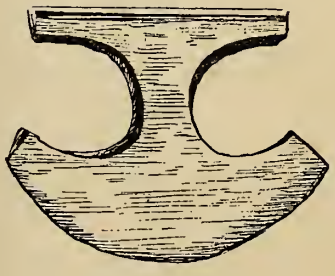


Fig. 23.



control of the blade was secured." The specimens illustrated in figs. 22 and 23 were collected by E. G. Squier, from whose work, Peru, Incidents of Travel, page 174, I made the copies. In fig. 22 the handle is seen to stand straight, which undoubtedly is its normal position, while the oblique standing of the Ewbank specimen will be attributed to its battered condition. The top is crowned by the form of a quadruped with a cub bent across its back. In fig. 23 the handle appears in a horizontal position like knives of the same shape, which to-day are used in our kitchens.

Fig. 24.

Fig. 24, in Mr. Squier's opinion, represents an ancient Peruvian mason's trowel. He says that vast numbers of them are found not only in Chimu, but on the whole Peruvian coast. They vary in dimensions from a few inches to nearly two feet in length, but are unvarying in shape. Into whose hands all these valuable Peruvian relics have passed, I was unable to ascertain. Mr. Squier omitted to give their accurate measurements. Should the so-called trowel, however, be found of sufficient thickness, I should think it had served as a chisel. Trowels would not vary in dimensions from two to twenty-four inches.

Attention was called by the Messrs. Bastian and Voss, of the Berlin Ethnological Museum, to certain paintings on an earthen vessel, which was dug up at Truxillo, the ancient site of Chimu, in 1874. Text and illustration may be found in Zeitschrift für Ethnologie, Berlin, 1876, Band VIII., Heft II., page 163 and Band IX., 1877, page 143. The painting shows twenty warriors in full battle dress. They are arranged in ten groups, each group consisting of one man who is the victor and the other the conquered.

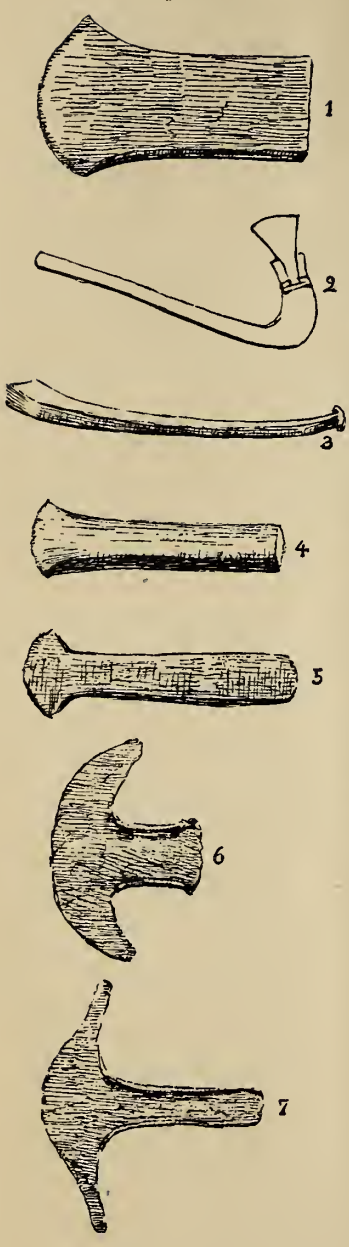
Of these twenty men eight are bare-headed, six wear helmets either with straight plumes or with nothing else at their tops; six men, however, have the top of their helmets crowned with an object of semi-lunar shape. In order to impress you with the correct idea of these curious helmets,

Fig. 25.

Fig. 26.

I give a diagram of them in fig. 25. Dr. Voss does not advance any opinion as to the material of which these helmet-crests were made, but Dr. Bastian is more outspoken on this subject. He declares these crests were made of bronze or copper, and that by the medium of these crests the true meaning of those tau-formed copper blades, which are found in Mexico, was to be explained. That they represent crests there is no doubt. Of what material, it is difficult to decipher. They seem to be direct imitations from nature, as suggested in fig. 26, copied

Fig. 27.



from a Peruvian earthen vessel, in the possession of Dr. E. Hamilton Davis, New York. On it, the figure of the grotesque gecco, the helmeted tropical lizard, is etched, six of them in succession forming a zone spread about the vessel. But it is difficult to understand why the painter, with the intention of representing copper blades, should not have given these helmet-crests a uniform color, and as seen in the cuts, have represented one of them in white and the other in black color! Nor is there any record in existence that the Mexican warriors wore helmets with Tau-shaped copper crests, either in stone, clay, or in the picture-codices and the printed texts of the Spanish chroniclers.

As to the Mexican cutting tools, a few new specimens have come to light since I called attention to this subject. In the adjoined cuts I give you, in diminutive size, a survey of the whole stock of varieties hitherto known.

Fig. 1 represents the shape of the Mexican axe blade, which is the same as is found in the whole of Central

America and also in all parts of the globe. This specimen of axe was called *tepuz-quauh-xexeloni*, from *tepuz* metal, *quauh* tree, and *xeloa* to cut, hence the wood-axe proper. Despite of the abundance of axes at the time of the Conquest, at present they seem to be pretty scarce. The specimen recently taken from a tumulus in San Luis de Potosi, was discussed and illustrated by Mr. F. W. Putnam in the Fifteenth Annual Report of the Peabody Museum, vol. III., page 130. The cut I give is taken from Dupaix, Antiquités Mexicaines, vol. II., Exped. 2d, pl. II., fig. 4. The axe is from Cuilapa.

Fig. 2 is copied from Kingsb. Coll., vol. I., page 10, fig. 5 and page 71, fig. 71. While the solid wood-axe had a straight handle, this one is curved like those found in Southern Germany and Switzerland. It was the instrument used by the carpenters to prepare the wood for building or other purposes. They seem to have employed two kinds, one larger, the other smaller, as we conclude from the Nahuatl vocabulary. The first was called *tlaximaloni*, carpenters' adze or something like it, and the other "*tlaxima tepuz tontli*, little axe," *tlaximal*, carpenter, *tepuz*, metal, and *tontli*, diminutive form. The pictures show the blade very pointed on both sides.

Fig. 3 is the representation ($\frac{1}{2}$ size) of a bronze (?) chisel recently discovered in Mexico, preserved in the National Museum, and described by G. Mendoza in Anales del Museo de México, Tomo I., pagina 117. "Density 8.875, copper 97.87, and tin 2.13, a minimum percentage of gold and zinc." Its purposes seem to have been to do fine work in wood carving, edging, mortising and the like, and I can well imagine that it was employed by wood carvers when busy in finishing off such tablets as were brought home by Dr. Bernonilly, from the walls of Tikal (Yucatan). See illustrations of these tablets in Dés. Charnay's "Les anciennes villes du Nouveau Monde, Paris, 1885, page 409.

Fig. 4 is the illustration of the Dupaix bronze chisel. It is cylindrical in form, measures 7 Spanish inches in length and 1 inch in diameter. The author says, it was one of the many specimens which he found in existence in the city of Antequera, in 1803. In shape and dimensions it is almost identical with our modern chisels used by stone-cutters.

Fig. 5 is the representation of one of the many instruments which were lately brought over from Mexico by the Messrs. Agassiz, Ober and Aymé, and of which Curator Putnam gave us the illustrations. See 15th Report Peabody Museum, pages 133 and 134. I do not think it is correct to term them "axes." In common terminology the word *axe* is employed for such instruments as are made and used for the purpose of felling trees. Their blade (see fig. 1) is of the simplest form imaginable, while ours shows two parts, a blade of semi-lunar form, provided with a long shank. It was evidently destined to do a work less coarse than that which the axe did, and to have been used in carpentry. In such a case, we may consider it to be the blade belonging to the curved handle, as shown in fig. 2, the doubt, however, remaining, whether it was set in like a hatchet, parallel to the handle, or like an adze, crosswise. The latter mounting seems to me to be the most probable, because it agrees with that of the curved-handled tools as found in Germany, Austria and Switzerland. Our cut is taken from the Mendoza Codex and we cannot decide this question, because, like all the pictures made by the natives, it gives but a rude outline drawing. But if the purposes of the tool are still open to conjecture, why should we not imagine that when set in an appropriate handle it should have served as a sculptor's chisel. I cannot refrain from making this suggestion, though it is apt to arouse a score of objections. The form of its edge, its whole shape, together with its solidity make it a tool suitable for performing any kind of sculptural work, and this would not be the first

instance that man, in the earlier stage of industry, employed the same tool or weapon for all the various purposes to which it was capable of being turned.[1]

I now pass to the much controverted Tau-shaped copper instruments. The two varieties, known to us through specimens brought over from Mexico, are those represented in figs. 6 and 7. They vary considerably in size. A specimen, illustrated by Dupaix, shows a span of 20^{cm}, one in the Smithsonian Institution and another in the possession of Mr. Stephen Salisbury, Worcester, shows 16^{cm} span, one of my own 14^{cm}, one in the Trocadero, Paris, 12^{cm}, and if we can trust Torquemada (Mon. Ind., vol. II., Lib. XIV., Cap. 14), who says that he had specimens in his hand of three and four fingers width, they come down to 8 and 6^{cm}, this distance measured from the top of the one to that of the other horn. For other details I refer to Mr. F. W. Putnam's Notes on Copper Implements from Mexico, Proceedings American Antiquarian Society, vol. II., New Series, Part 2, page 235, October 21, 1882. The Spanish writers, one copying the other, are unanimous in calling these copper-taus money which had circulated among the natives before the Conquest. This is not an exhaustive definition, but as far as it goes it is a very plausible one when we consider that the copper taus may have come into the market and become objects of barter, as we read of copper bells as well as grains of the cacao fruit, bales of cotton, axes and other articles of common necessity. Dupaix, after proceeding from Antequera (where he obtained the specimens mentioned above), to Mitla, observed in the church in that place a picture of San Isidro, holding in his right hand a pole armed with the problematic copper tau. He comes to the conclusion that it represents an agricultural implement. Bastian inclines

[1] Much information on this topic may be taken from A. H. Lane Fox, Primitive Warfare, Journal of the United Service Institution, vol. XIII., 1869, page 507.

to take it for the crest of a Mexican helmet. Our associate, Mr. F. W. Putnam (see Proceedings American Antiquarian Society, October 21, 1882, page ii, Additional Note), is impressed with the idea that "they may possibly have been used in connection with the manufacture of pottery," and "that they would certainly answer admirably for scraping and smoothing the clay." He examined "the semi-lunar edges of all these specimens with a lens, found them to be dull and rounded, as if they had been used as scrapers, the edges showing many little indentations and irregularities, which are evidence of considerable and rather rough service." I, for my part, cannot understand the reason why an instrument of so peculiar and so delicate a shape as these copper taus are, should have been manufactured for the purposes suggested by Mr. Putnam, nor that this suggestion could be derived at all from the circumstance that its edge is dull, rounded and shows rough service. If these edges are dull and under the lens present a rounded and battered condition, no other proof is given by this fact, than that they shared the fate of every edge which has been in use and taxed to continuous service, and that it became dull and was sharpened again on the whetstone or by means of hammering it with some other stone. Nor does Mr. Putnam offer any evidence why the instrument should be connected with the manufacture of pottery. It does not present any peculiar characteristics which would render it more suitable for this sort of work than for any other. It would be presuming on my part to remind Mr. Putnam of the methods the natives employ in preparing pottery. No instrument of this kind was ever found in their hands employed for this object. The making of pottery is exclusively the women's lot. They knead the wet substance of the clay first with their hands and then between their fingers, and the only instrument which they later on employ in finishing and smoothing the surface of the vessel, is a flat wedge-shaped stone, which

throughout the Spanish colonies is known under the name of "*piedra de rayo*," thunderbolt. I trust, that upon closer examination and comparison with other instruments, we shall find out the true purposes which the copper-tau served in ancient Mexico.

As to the weapons employed by the Aztecs and other Central American tribes we are pretty well informed. They naturally took the eye of the Spanish conqueror at once. However as to the tools and implements belonging to the household and industries the conqueror took no interest in them, and consequently we do not find them on record, and any tool we discover at present, and the use of which is not apparent, must be defined by means of circumstantial evidence. To this day we know only that they had axes, adzes and chisels, and specimens of these are in our hands. But it is evident that the stock of their tools must have been by far larger. So for instance they must have required something like a knife. Though the knife which we use to-day differs materially from the copper-tau, still I believe this to have been the knife of that time. As a tool which cuts is one of the necessaries of life and cannot be dispensed with, either in housekeeping or in industry, and furthermore, as no instrument in Mexico has been found which could fill up the place left empty in the stock of tools, the copper-tau is getting a chance to be regarded in another light than it was before. Look at the shank of this specimen. Notice these lateral flanges, which are curiously bent over towards both of its sides. They were expressly hammered into this shape in order to secure a handle by which to grasp the tool. Now give this blunt edge a few nice strokes of sharpening with this whetstone, take hold of the tool firmly with your hand, with thumb extended, the wrist resting on the table, set the point of the blade on this thick paste-board, press and cut forward towards the other point, and from the effect caused only on this paste-board you may judge to

how many more services this larger specimen as well as those of minor size could have been turned. There was never a doubt as to the particular use of the above-mentioned specimens, which were collected in Peru. They are indeed of better workmanship than these of Mexico. But in principle, conception and purpose they will be recognized to be identical. They served as knives!

The subject I have brought before you is susceptible of more expansion than I was capable to give it in words or illustrations. We often become more useful through that which we suggest than through that we offer in the form of positive results.